I CLAIM AS MY INVENTION:

1. A radio-frequency antenna for a magnetic resonance system comprising:

a plurality of antenna rods, each antenna rod having opposite ends;

two rings;

said antenna rods being regularly disposed around a longitudinal antenna axis with the respective opposite ends of each of said antenna rods being connected to said rings, each of said antenna rods having a middle region between said rings and proceeding substantially parallel to said antenna axis; and

each of said antenna rods being bent radially inwardly toward said antenna axis only in an outermost 10% of said longitudinal length at each of said opposite ends for causing each of said antenna rods to have a rod spacing from said antenna axis that is larger than a ring spacing of at least one of said rings from said antenna axis.

2. A radio-frequency antenna as claimed in claim 1 wherein a difference between said ring spacing and said rod spacing is at least 5 mm.

3. A radio-frequency antenna as claimed in claim 2 wherein said difference is in a range between 10 and 15 mm.

4. A radio-frequency antenna as claimed in claim 1 comprising radio-frequency shielding radially externally surrounding said antenna rods and said rings.

5. A radio-frequency antenna as claimed in claim 4 wherein said radio-frequency shielding is disposed at a shielding spacing from said antenna axis, and wherein a difference between said ring spacing and said rod spacing is at least 15% of a difference between said shielding spacing and said rod spacing.

6. A radio-frequency antenna as claimed in claim 5 wherein said difference is in a range between 20 and 40%.

7. A radio-frequency antenna as claimed in claim 4 wherein said radio-frequency shielding is symmetrically disposed relative to said antenna axis.

8. A radio-frequency antenna as claimed in claim 4 wherein said radio-frequency shielding is asymmetrically disposed relative to said antenna axis.

9. A radio-frequency antenna as claimed in claim 1 comprising exactly two detuning circuits electrically connected to at least one of said rings.

10. A radio-frequency antenna as claimed in claim 9 comprising supply cables connected to said at least one of said rings, and wherein said two detuning circuits are connected to said supply cables.

11. A radio-frequency antenna as claimed in claim 1 comprising a carrier tube having an exterior to which said antenna rods are mounted.

12. A radio-frequency antenna as claimed in claim 1 wherein said rod spacing is between 25 and 35 cm.

13. A radio-frequency antenna as claimed in claim 1 wherein said antenna rods comprise two groups of antenna rods, one of said groups being circumferentially rotated relative to the other around said antenna axis, the antenna rods in each of said groups being regularly disposed around said antenna axis, and the antenna rods in one of said groups having a rod spacing that is different from the rod spacing of the antenna rods in another of said groups.

14. A radio-frequency antenna as claimed in claim 1 wherein said antenna rods are circularly disposed around said antenna axis.

15. A radio-frequency antenna as claimed in claim 1 wherein said antenna rods are elliptically disposed around said antenna axis.

16. A radio-frequency antenna as claimed in claim 1 wherein said rings are symmetrically disposed relative to said antenna axis.

17. A radio-frequency antenna as claimed in claim 1 wherein said rings are asymmetrically disposed relative to said antenna axis.

18. A radio-frequency antenna for a magnetic resonance system comprising:

a plurality of antenna rods, each antenna rod having opposite ends;

two rings;

said antenna rods being regularly disposed around a longitudinal antenna axis with the respective opposite ends of each of said antenna rods being connected to said rings, each of said antenna rods having a middle region between said rings and proceeding substantially parallel to said antenna axis; and

each of said antenna rods proceeding radially inwardly toward said antenna axis from said middle region over at least 20% of said longitudinal length, and exhibiting no radially inward change in an outermost 10% of said longitudinal length at each of said opposite ends, for causing said antenna rods to have a rod spacing from said antenna axis that is larger than a ring spacing from said antenna axis for at least one of said rings.

19. A radio-frequency antenna as claimed in claim 18 wherein a difference between said ring spacing and said rod spacing is at least 5 mm.

20. A radio-frequency antenna as claimed in claim 19 wherein said difference is in a range between 10 and 15 mm.

21. A radio-frequency antenna as claimed in claim 18 comprising radio-frequency shielding radially externally surrounding said antenna rods and said rings.

22. A radio-frequency antenna as claimed in claim 21 wherein said radio-frequency shielding is disposed at a shielding spacing from said antenna axis, and wherein a difference between said ring spacing and said rod spacing is at least 15% of a difference between said shielding spacing and said rod spacing.

23. A radio-frequency antenna as claimed in claim 22 wherein said difference is in a range between 20 and 40%.

24. A radio-frequency antenna as claimed in claim 21 wherein said radio-frequency shielding is symmetrically disposed relative to said antenna axis.

25. A radio-frequency antenna as claimed in claim 21 wherein said radio-frequency shielding is asymmetrically disposed relative to said antenna axis.

26. A radio-frequency antenna as claimed in claim 18 comprising exactly two detuning circuits electrically connected to at least one of said rings.

27. A radio-frequency antenna as claimed in claim 26 comprising supply cables connected to said at least one of said rings, and wherein said two detuning circuits are connected to said supply cables.

28. A radio-frequency antenna as claimed in claim 18 comprising a carrier tube having an exterior to which said antenna rods are mounted.

29. A radio-frequency antenna as claimed in claim 18 wherein said rod spacing is between 25 and 35 cm.

30. A radio-frequency antenna as claimed in claim 18 wherein said antenna rods comprise two groups of antenna rods, one of said groups being circumferentially rotated relative to the other around said antenna axis, the antenna rods in each of said groups being regularly disposed around said antenna axis, and

the antenna rods in one of said groups having a rod spacing that is different from the rod spacing of the antenna rods in another of said groups.

31. A radio-frequency antenna as claimed in claim 18 wherein said antenna rods are circularly disposed around said antenna axis.

32. A radio-frequency antenna as claimed in claim 18 wherein said antenna rods are elliptically disposed around said antenna axis.

33. A radio-frequency antenna as claimed in claim 18 wherein said rings are symmetrically disposed relative to said antenna axis.

34. A radio-frequency antenna as claimed in claim 18 wherein said rings are asymmetrically disposed relative to said antenna axis.

35. A radio-frequency antenna for a magnetic resonance system comprising:

a plurality of antenna rods, each antenna rod having opposite ends;

two rings;

said antenna rods being regularly disposed around a longitudinal antenna axis with the respective opposite ends of each of said antenna rods being connected to said rings, each of said antenna rods having a middle region between said rings and proceeding substantially parallel to said antenna axis; and

each of said rings having a plurality of radially outwardly projecting connection regions at which said rings are respectively connected to the opposite ends of the antenna rods, for causing each of said antenna rods to have a rod spacing from said antenna axis that is larger than a ring spacing from the antenna axis for each of said rings.

36. A radio-frequency antenna as claimed in claim 35 wherein a difference between said ring spacing and said rod spacing is at least 5 mm.

37. A radio-frequency antenna as claimed in claim 36 wherein said difference is in a range between 10 and 15 mm.

38. A radio-frequency antenna as claimed in claim 35 comprising radio-frequency shielding radially externally surrounding said antenna rods and said rings.

39. A radio-frequency antenna as claimed in claim 38 wherein said radio-frequency shielding is disposed at a shielding spacing from said antenna axis, and wherein a difference between said ring spacing and said rod spacing is at least 15% of a difference between said shielding spacing and said rod spacing.

40. A radio-frequency antenna as claimed in claim 39 wherein said difference is in a range between 20 and 40%.

41. A radio-frequency antenna as claimed in claim 38 wherein said radio-frequency shielding is symmetrically disposed relative to said antenna axis.

42. A radio-frequency antenna as claimed in claim 38 wherein said radio-frequency shielding is asymmetrically disposed relative to said antenna axis.

43. A radio-frequency antenna as claimed in claim 35 comprising exactly two detuning circuits electrically connected to at least one of said rings.

44. A radio-frequency antenna as claimed in claim 43 comprising supply cables connected to said at least one of said rings, and wherein said two detuning circuits are connected to said supply cables.

45. A radio-frequency antenna as claimed in claim 35 comprising a carrier tube having an exterior to which said antenna rods are mounted.

46. A radio-frequency antenna as claimed in claim 35 wherein said rod spacing is between 25 and 35 cm.

47. A radio-frequency antenna as claimed in claim 35 wherein said antenna rods comprise two groups of antenna rods, one of said groups being circumferentially rotated relative to the other around said antenna axis, the antenna rods in each of said groups being regularly disposed around said antenna axis, and the antenna rods in one of said groups having a rod spacing that is different from the rod spacing of the antenna rods in another of said groups.

48. A radio-frequency antenna as claimed in claim 35 wherein said antenna rods are circularly disposed around said antenna axis.

49. A radio-frequency antenna as claimed in claim 35 wherein said antenna rods are elliptically disposed around said antenna axis.

50. A radio-frequency antenna as claimed in claim 35 wherein said rings are symmetrically disposed relative to said antenna axis.

51. A radio-frequency antenna as claimed in claim 35 wherein said rings are asymmetrically disposed relative to said antenna axis.

52. A radio-frequency antenna for a magnetic resonance system comprising:

a plurality of antenna rods;

two rings;

said antenna rods being regularly disposed around a longitudinal antenna axis and having opposite ends respectively connected to said rings, with each of said antenna rods forming an inclination angle relative to said antenna axis, causing a combination of said antenna rods and said rings to have a frustrum shape, with each of said antenna rods having one of said opposite ends disposed farther from said antenna axis than the other of said opposite ends, and each antenna rod having a rod

spacing from said antenna axis measured at said one of said opposite ends that is farther from said antenna axis; and

said rod spacing being larger than a ring spacing of the antenna ring connected to the respective opposite ends of the antenna rods that are disposed farther from said antenna axis.

53. A radio-frequency antenna as claimed in claim 52 wherein a difference between said ring spacing and said rod spacing is at least 5 mm.

54. A radio-frequency antenna as claimed in claim 53 wherein said difference is in a range between 10 and 15 mm.

55. A radio-frequency antenna as claimed in claim 52 comprising radio-frequency shielding radially externally surrounding said antenna rods and said rings.

56. A radio-frequency antenna as claimed in claim 55 wherein said radio-frequency shielding is disposed at a shielding spacing from said antenna axis, and wherein a difference between said ring spacing and said rod spacing is at least 15% of a difference between said shielding spacing and said rod spacing.

57. A radio-frequency antenna as claimed in claim 56 wherein said difference is in a range between 20 and 40%.

58. A radio-frequency antenna as claimed in claim 55 wherein said radio-frequency shielding is symmetrically disposed relative to said antenna axis.

59. A radio-frequency antenna as claimed in claim 55 wherein said radio-frequency shielding is asymmetrically disposed relative to said antenna axis.

60. A radio-frequency antenna as claimed in claim 52 comprising exactly two detuning circuits electrically connected to at least one of said rings.

61. A radio-frequency antenna as claimed in claim 60 comprising supply cables connected to said at least one of said rings, and wherein said two detuning circuits are connected to said supply cables.

62. A radio-frequency antenna as claimed in claim 52 comprising a carrier tube having an exterior to which said antenna rods are mounted.

63. A radio-frequency antenna as claimed in claim 52 wherein said rod spacing is between 25 and 35 cm.

64. A radio-frequency antenna as claimed in claim 52 wherein said antenna rods comprise two groups of antenna rods, one of said groups being circumferentially rotated relative to the other around said antenna axis, the antenna rods in each of said groups being regularly disposed around said antenna axis, and the antenna rods in one of said groups having a rod spacing that is different from the rod spacing of the antenna rods in another of said groups.

65. A radio-frequency antenna as claimed in claim 52 wherein said antenna rods are circularly disposed around said antenna axis.

66. A radio-frequency antenna as claimed in claim 52 wherein said antenna rods are elliptically disposed around said antenna axis.

67. A radio-frequency antenna as claimed in claim 52 wherein said rings are symmetrically disposed relative to said antenna axis.

68. A radio-frequency antenna as claimed in claim 52 wherein said rings are asymmetrically disposed relative to said antenna axis.

69. A radio-frequency antenna as claimed in claim 52 wherein, for each of said antenna rods, said one of said opposite ends that is disposed farther from said antenna axis projects radially inwardly substantially in a plane containing said one of said rings to which said of said opposites ends of said antenna rod is connected.

70. A radio-frequency antenna as claimed in claim 52 wherein said one of said rings, to which the respective opposite ends of the antenna rods are connected that are disposed farther from said antenna axis, has a plurality of radially outwardly projecting connections to the respective antenna rods.